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SUBSTANCE-ABUSING MOTHERS IN RESIDENTIAL TREATMENT WITH THEIR BABIES: IMPORTANCE OF PRE- AND POSTNATAL MATERNAL REFLECTIVE FUNCTIONING

Marjukka Pajulo,
University of Turku

Nina Pyykkönen,
University of Turku

Mirjam Kalland,
University of Helsinki

Jari Sinkkonen,
Save the Children Organization, Finland and University of Turku

Hans Helenius,
University of Turku

Raija-Leena Punamäki, and
University of Helsinki

Nancy Suchman
Yale University School of Medicine and Yale Child Study Center

Abstract

A residential treatment program has been developed specifically for substance-abusing pregnant and parenting women in Finland, focusing on simultaneously supporting maternal abstinence from substances and the mother–baby relationship. The aims of the study are to explore maternal pre- and postnatal reflective functioning and its association with background factors, maternal exposure to trauma, and psychiatric symptoms, postnatal interaction, child development, and later child foster care placement. Participants were 34 mother–baby pairs living in three residential program units during the pre- to postnatal period. We employed self-report questionnaires on background, trauma history, and psychiatric symptoms (Brief Symptom Inventory: L.R. Derogatis, 1993; Edinburgh Postnatal Depression Scale: J.L. Cox, J.M. Holden, & R. Sagovsky, 1987; Traumatic Antecedents Questionnaire: B. Van der Kolk, 2003), videotaped mother–child interactions coded for sensitivity, control, and unresponsiveness (Care Index for Infants and Toddlers: P. Crittenden, 2003); a standardized test of child development (Bayley Scales of Infant Development-II: N. Bayley, 1993); and semistructured interviews for maternal reflective functioning (Pregnancy Interview: A. Slade, E. Bernbach, J. Grienberger, D.W. Levy, & A. Locker, 2002; Parent Development Interview: A. Slade et al., 2005). Pre- and postnatal maternal reflective functioning (RF) was on average low, but varied considerably across participants. Average RF increased significantly during the intervention. Increase in RF level was found to be associated with type of abused substance and maternal trauma history. Mothers who showed lower postnatal RF levels relapsed to substance use more often after completing a residential treatment

period, and their children were more likely to be placed in foster care. The intensive focus on maternal RF is an important direction in the development of efficacious treatment for this very high risk population.

CLINICAL BACKGROUND

Substance abuse among pregnant women and mothers of infants and young children is a growing social and clinical problem. In Finland, for example, maternal substance abuse is one of the most common reasons for the removal of young children from their biological parents' custody (Hiitola, 2008). Development of new, appropriately focused treatment interventions is greatly needed to improve the prognosis of these mothers and their children (Ashley, Marsden, & Brady, 2003; Jansson et al., 1996; Suchman, Pajulo, DeCoste, & Mayes, 2006).

In the last 10 years, identification and referral of mothers with substance-use problems within the primary health care system in Finland has improved (Ahlqvist et al., 2006), and the importance of keeping mother and baby together in treatment has been increasingly recognized (Andersson, Hyytinen, & Kuorelahti, 2008). However, there is a great need for developing the content and focus of the treatment to increase its efficacy. For this very high risk population, psychoeducation, parenting skills training, and behavior-targeted interventions have generally not demonstrated clinical efficacy in fostering changes in maternal understanding of children's behavior and of the mother-child relationship—changes that in the long run may be essential for the maintenance of any treatment effects.

The substance-abusing mother and her substance-exposed baby are difficult partners for each other. The substance-exposed infant often has an impaired ability to regulate his or her states of wakefulness, sleep, or distress, and needs especially sensitive care from his or her parent. At the same time, the mother usually has a reduced capacity to read and respond to the child's communicative signals (Beeghly & Tronick, 1994). Among the most worrisome deficiencies and specific challenges found in these mothers' parenting is their inability to stay emotionally connected to the baby; that is, to keep their baby in mind and a priority even over their own needs. The mother often cannot adjust her own needs, rhythm, and behavior in ways that are responsive and sensitive to the baby, and the baby is often unable to follow the mother in her actions or does not respond predictably in ways that would bolster the mother's sense of effectiveness as a parent. The mother also often has great difficulties anticipating and following the infant in his or her next developmental stage and new skills, in part because of her unrealistic expectations for the child and in part because of her difficulty in differentiating the child's needs from her own (Mayes & Pajulo, 2006; Mayes & Truman, 2002). The negative experience of misunderstanding in dyadic interaction invariably leads to increased risk for child neglect and abuse (Kalland, 2001). Early parenting interventions, from pregnancy onward, are therefore considered crucial from somatic, mental health, and child development points of view (Pajulo, Suchman, Kalland, & Mayes, 2006; Raphael-Leff, 1991; Slade, 2002).

Parents and families affected by substance abuse are among the most challenging group for infant mental health professionals; their circumstances easily elicit feelings of helplessness, frustration, and even anger in clinicians at all levels of skill and experience. Mothers with substance-use disorders also have great difficulty staying in treatment as well as completing research evaluations. Developing pre- and perinatal treatment for substance-abusing women is demanding work, and collaboration among specialists from several disciplines (e.g., adult psychiatry, addiction psychiatry, obstetrics, pediatrics, and infant psychiatry) is critical (Lester, Andreozzi & Appiah, 2004). Broader collaboration across disciplines (e.g., social work, primary health care, hospitals) also is essential because treatment must integrate

multiple elements and levels of assistance (e.g., basic needs, social network support, psychoeducation, drug replacement and psychiatric medication, psychiatric care, parenting support, and promotion of the early relationship with the baby).

Focusing treatment on the relationship between mother and infant has been found to be a particularly promising area of work. This may be because in comparison with normative mothers (or even mothers from other risk groups), substance-abusing pregnant women encounter many more obstacles to becoming deeply attached and “falling in love” with their infant. These obstacles include histories of childhood and lifetime trauma, psychiatric and medical problems, and absence of social support (Carmichael Olson, O’Connor, & Fitzgerald, 2001; Grella, Joshi, & Hser, 2000; Lester & Tronick, 1994; Mayes & Truman, 2002; Pajulo, 2001; Suchman, McMahon, Slade, & Luthar, 2004). In addition, having an unplanned pregnancy, ambivalent feelings about keeping the baby, feelings of guilt and uncertainty related to the baby’s health, and loss of prior children to foster care can make investing in and concentrating on pregnancy and imagining a future with one’s child even more difficult.

Strengthening maternal–fetal attachment can foster stronger motivation in the mother to become and remain abstinent from drug use, take better care of her own health, and make changes in her own social relationships and life circumstances for the sake of her baby. Unlike previously examined intervention approaches, treatment that focuses directly and intensively on *both* supporting the mother–baby relationship *and* maternal abstinence from drugs and beginning during pregnancy may have more potential for strengthening the mother–baby bond and promoting the baby’s development. One promising approach to conducting this “attachment- and love-enhancing work” is to focus explicitly on strengthening a mother’s capacity to mentalize.

THEORETICAL BACKGROUND

During the last 10 years, British psychoanalysts have increasingly drawn attention to the definition and importance of the concept of reflective functioning (RF; operationalized from the concept of mentalizing) in human development. This concept has particularly strong relevance for the treatment of mother–baby pairs when the mother has a substance-abuse history. RF refers to the psychological processes underlying one’s capacity to understand oneself and others in terms of mental states (i.e., feelings, beliefs, intentions, and desires) and to reason about one’s own and others’ behavior in relation to mental states (Fonagy, Gergely, Jurist, & Target, 2002). RF enables an individual to understand another person’s behavior as meaningful and predictable. The concept is theoretically rooted in both object relations and attachment theory, and can be measured in parents as their capacity to mentalize about themselves, their children, and their relationships with their children.

A reflective parent is both motivated and able to think about his or her child’s behavior and experience in terms of (or as a function of) the child’s mental states (i.e., in terms of the child’s psychological reality). A reflective parent also is able to think about his or her own mental states as influencing and influenced by those of the child’s. Highly reflective parents also understand that mental states can be ambiguous, that they can change in valence or intensity over time, and that they can be hidden or disguised (Slade, 2002, 2005, 2008). In addition to being a metacognitive capacity, RF also refers to the ability to hold, regulate, and experience emotions through the ability to reflect on feelings before acting on or responding to them.

Maternal RF during pregnancy and early motherhood involves the capacity to think about the baby as a separate, individual person with his or her own experience and feelings, from early on. Although the parent is aware that it is impossible to know for certain what the baby

is experiencing or how the baby is feeling, the parent recognizes the value in thinking about the baby's thoughts, intentions, and experiences and making efforts to understand the baby's mind. Considering the baby's point of view and experience enables the parent to find alternative explanations for the baby's behavior, recognizing many possible intentions, wishes, and expectations that might help to explain the baby's behavior. The parent's capacity to recognize alternative explanations for the baby's behavior enlarges the parent's understanding of the baby's personality and creates room for the baby's true individuality. Importantly, this capacity to consider alternative explanations also lessens the likelihood that a parent will harbor rigid or distorted representations and misinterpretations of the child, in turn reducing potential for miscommunication during early interactions. Instead, a reflective parent adopts a more curious and inquisitive stance toward the child's mind, development, and skills, and brings more joy and novelty to interactions with the baby and daily life routines.

The capacity for RF is considered a prerequisite for parental sensitivity in parent-child relationships. RF also is considered a mediator in the intergenerational transmission of attachment security, and plays a critical role in shaping maternal representations of children that are characterized by understanding and caring versus indifference and rigidity. Mothers who have experienced considerable deprivation and trauma in their lifetimes but are nonetheless highly reflective are more likely to have securely attached children whereas their counterparts who have limited reflective capacities almost invariably have insecurely attached children (Fonagy, Steele, Moran, Steele, & Higgitt, 1991; Fonagy et al., 1995).

Maternal RF has been found to correlate positively with children's social competence and negatively with children's attention problems, social withdrawal, maternal distress, and dysfunctional mother-child interaction (Fonagy et al., 2002). Despite being a capacity rooted in early experiences, parental RF can improve in response to interventions that directly target reflective capacities in high-risk parents (Schechter, Kaminer, Grienberger, & Amat, 2003; Schechter et al., 2006; Schechter, Zeanah, & Myers, 2002; Slade, Grienberger, Bernbach, Levy, & Locker, 2005, and substance using mothers in particular (Suchman, DeCoste, Castiglioni, McMahon, Rounsaville, & Mayes, 2010; Suchman, DeCoste, McMahon, Rounsaville, & Mayes (2011).

Among substance-using mothers, reflective abilities toward their children are generally low (Suchman, DeCoste, Castiglioni, Legow, & Mayes, 2008; Truman, Levy, & Mayes, 2004). Substance dependence is known to weaken brain functions that are needed in caring for small children and being a parent (e.g., functions related to motivation, reward, satisfaction, memory, attention, self-awareness, capacity to reflect on behavior, stress tolerance, impulse control, and emotional regulation; see Goldstein et al., 2009; Koob & Volkow, 2010). Brain-imaging studies have shown that during normal pregnancy and perinatal phases, neurobiological changes in the mother's brain (especially in the reward system) lead to a state of "maternal preoccupation" during which the baby and motherhood become a strong, intense, and natural source of reward and joy (Mayes, Magidson, Lejuez, & Nicholls, 2009; Swain, Lorberbaum, Kose, & Strathearn, 2007). The concept of RF (i.e., capacity to mentalize) has a special relevance, then, to substance-abusing mothers because substance-abuse problems and dependency are likely to weaken the parent's motivation and capacity to invest in a close relationship with the baby and to interfere with natural sources of reward and satisfaction (Allen, Fonagy, & Bateman, 2008).

Problems with motivation and capacity to invest in the mother-child relationship have been observed in clinical work with substance-abusing mothers and their infants. Substance-abusing mothers tend to have specific problems in recognizing and processing emotions and thinking about feelings and experience—their own and those of their children. In addition,

mothers with substance-use problems often had negative experiences of being parented during infancy. These experiences, in turn, may have contributed to negative, idealized, or fragile mental representations of infants and parenting. Together with mental health problems and other psychosocial vulnerabilities, the neurological and developmental deficits associated with maternal addiction are easily transmitted during mother–baby interactions. In this study, we expected that improvement in the capacity for RF would help to offset the impact of developmental, neurological, representational, and behavioral deficits on the mother’s capacity to hold her infant’s best interests in mind, take better care of her own health, and stay abstinent from substances.

RESEARCH CONTEXT

General Description

In Finland, a residential parenting program has been in development since 1990 for the most severe cases of substance-abusing mother–baby pairs. The program has been designed to support the mother in her efforts toward abstinence as well as her relationship with the baby during pre- and perinatal periods. The treatment units are part of the child protection system in the social services sector (called the *Federation of Mother and Child Homes and Shelters*), but the treatment model combines approaches from infant psychiatry, addiction research, and social work. Referrals of women to the units are usually made by a social-welfare agency or hospital maternity unit where the mother’s problem with alcohol and/or other drugs has been identified. Currently, seven units have been established, situated in different regions of Finland. Each unit has the capacity to serve five mother–baby-pairs and one whole family. The treatment occurs throughout each day on all days of the week. Mothers are expected to stay substance-free during their stay in the residential program.

Content of the Intervention: A Summary

A detailed description of the relationship-based intervention and the collaborative network development conducted in the residential units has been published in a separate article in this journal (Pajulo et al., 2006). The residential facility provides a substance-free environment and model of healthy living for the mothers, which are important intervention components. Mothers participate in planning and preparing healthy meals, share responsibility for household chores, learn about personal self-care, and are supported to maintain their own physical health, organize their daily lives, and plan enjoyable leisure activities. An equally important function of the residential unit is to assist the mother in planning for outpatient treatment and follow-up plans once her residential stay has ended.

Within the residential units, intervention involves several modalities, including individual counseling for each mother–baby pair, weekly group meetings on parenting themes and relapse issues, support for changing social networks (especially in relation to the spouse, who also is often a substance abuser), and encouragement of participation in detoxification, mental health, and other treatment facilities outside the unit.

The two primary aims of the treatment are to intensively support the mother’s relationship with her child as well as her efforts toward abstinence. From a neurobiological perspective, the underlying idea has been to “reset” the focus of the maternal brain reward system by encouraging the mother to become intensively involved with and interested in her future baby *during* pregnancy, increasing her interest and curiosity about her unborn child’s personality and developmental achievements, and experiencing satisfaction from positive interaction experiences once the baby is born.

Daily situations between the mother and baby form a natural and rich working arena, in both individual counseling and video-observation-based and group work. Specific approaches

and techniques used to enhance maternal RF include using a formal evaluation of the infant's developmental strengths and weaknesses as a starting point for discussing the meaning of developmental steps for the baby and the mother herself (see *Growing: Birth to Three*; Doan-Sampon, Wollenberg, & Campbell, 1993); strengthening the mothers' capacity for intuitively anticipating her child's next developmental zone (Stern, 1985); and considering the relational meaning for the mother of each new developmental step taken by the child. In addition, "speaking for the child" or "using the voice of the infant" is a technique used to help the mother pay attention to the baby's perspective. Watching multiple videotaped interaction moments (both positive and difficult) is used to help the mother read her child's cues and her own feelings.

AIMS OF THE STUDY

The purpose of this study was to explore, among the high-risk group of substance-abusing mother–baby pairs in this residential treatment program, if better maternal mentalizing capacity might be the mechanism of change for more positive treatment outcomes. Specifically, the aim was to explore: (a) the level and individual variation of maternal RF during pregnancy and the postnatal phase, (b) the change in maternal RF from pregnancy to postnatal phase (i.e., during the intervention), (c) factors related to the pre- and postnatal maternal RF level, (d) factors related to the amount of positive change in maternal RF during intervention, and (e) the importance of maternal pre- and postnatal RF for later child-welfare actions (e.g., temporary and permanent child placement in foster care at 2-year follow-up due to maternal relapse and inadequate parenting).

METHODS

Participants

Participants in this study were 34 mother–baby pairs in three units from different regions of Finland. Mothers were included in the study if they met the following criteria: (a) They entered the unit during pregnancy or within 2 weeks following childbirth, (b) their treatment in the residential unit lasted at least 4 months' postpartum, (c) neither mother nor child had a known severe somatic problem or illness that was unrelated to the mother's substance use, and (d) the mother was expecting only one child. About 80% of the potential mothers entering the three units who met inclusion criteria were offered participation ($n = 56$). (Opportunities to offer participation to the other 20% were missed due to the leave or absence of staff members responsible for making referrals). Of those offered, 80% accepted participation and enrolled in the study ($N = 45$). Of the 45 mothers, 25% ($n = 11$) left the study before 4 months' postpartum due to unexpected termination of treatment in the unit. The final participation rate from all potential participants was thus 48%. A written informed consent was obtained from each mother. The research plan was approved by the joint ethical committee of Pirkanmaa Hospital District and the University of Tampere.

Procedure

Assessment information and the timeline are presented in Table 1. Data were collected primarily by the treatment-unit staff and involved multiple methods including semistructured interviews, written questionnaires, and videotaping of mother–child interactions (i.e., 7-min sections of free-play interactions). Mothers were fully aware of the videotape recording and its purpose. Child-development assessment was conducted by an outside child psychologist. Data for the 2-year follow-up were collected from community social workers to whom mothers were assigned at that time point and/or the mother herself, when possible.

Quality of mother–baby interaction and level of maternal RF were assessed using videotapes and transcribed interviews, respectively. Interaction videos were rated by two reliable outside coders who were blind to all other data and information about the mother at the time of assessment. In the few instances when coders disagreed on interaction scores, they reviewed the tapes together and negotiated the final scores.

Scoring of the RF interviews was conducted by the first author (M.P.), who was blind to other data and information about participants (including RF scores at other time points). At the time of assessment, Dr. Pajulo was the only Finnish researcher with training in scoring both the prenatal [The Pregnancy Interview (PI; Slade et al., 2002; Slade, Bernbach et al., 2005)] and postnatal versions (Parent Development Interview; PDI) of the RF interview. Dr. Pajulo achieved excellent interrater reliability of $= .85$ for Overall (total) RF Score on 20 English transcripts with Dr. Arietta Slade (the method author) (Slade, 2005; Slade et al., 2002, 2005; Slade, Grienberger et al., 2005).

Measures

Maternal RF—The PI (Slade et al., 2002; Slade, Bernbach et al., 2005) is a 24-item semistructured interview that asks about the mother’s emotional experience of her pregnancy; her view of the baby and her relationship with the baby, and thoughts, feelings, and changes experienced in relation to her own mother and her partner. The Parental Development Interview Revised (PDI-R; Slade et al., 2002; Slade, Bernbach et al., 2005) is a 40-item semistructured interview that asks about the parent’s view of the child and her relationship with the child, experience of being a parent, childhood experiences of her own parents, dependence of the child, experiences of separation with the child, and views of the future. Both interviews were audiotaped and then transcribed for scoring purposes.

For both interviews, a parent’s responses to individual questions are scored along a continuous scale (range = $-1-9$) (Fonagy, Target, Steele, & Steele, 1998) with anchor points describing different levels of RF ability as described in detail in the manual. An overall RF score for the whole interview also is given at the end of the interview, according to the specific instructions in the manual (RF total single score, range = $-1-9$).

In evaluating parental RF from a transcript, freshness and spontaneity of reflections about specific interaction episodes are taken into account, and the importance of episodic memory is emphasized. Generalized expressions, opinions, or clichés (indications of semantic memory associated with the left brain hemisphere) are not considered signs of RF. Three specific main criteria for true reflectiveness are considered: (a) the parent’s awareness of the nature of mental states (e.g., opacity and being susceptible to disguise), (b) the parent’s effort to tease out mental states underlying behavior, and (c) the parent’s ability to recognize developmental aspects of mental states. The number of indications of true reflectiveness found in the transcribed narrative is the basis for assigning an overall score. The greater the number of specific and varied indications of RF, the higher the score, with a score of -1 indicating a rejection of RF, scores of 0 to 2 indicating very weak ability for RF, a score 3 indicating weak ability, scores of 4 to 5 representing a normal or close-to-normal ability, and scores of 6 to 9 representing high or exceptionally high ability for RF. The RF scale has been validated in different studies using samples of ordinary pregnant women and mothers with small children, psychiatric patients, and borderline personality disorder patients (Fonagy, Steele, Moran et al., 1991; Fonagy, Steele, & Steele, 1991; Fonagy & Target, 1996; Grienberger, Kelly, & Slade, 2005, Slade et al., 2004 Steele & Steele, 2008).

Observation method, child-development method, and self-report measures—

Information about these methods and measures are presented in Tables 2 and 3.

Background and follow-up data—Questionnaires were constructed to collect data about sociodemographic background and pregnancy history (32 items), delivery (13 items), substance use and treatment history (46 items), substance-abuse treatment contacts during the study period (22 items), and somatic symptoms of the child (16 items). Mothers also were asked to order copies of their own and their children's hospital and well-baby clinic records. A disposition questionnaire (13 items) was constructed to collect information about the mother's living situation and possible child-placement arrangements (temporary and permanent) should she relapse or be unable to parent during the 2-year follow-up period.

Statistical Methods

Associations between continuous variables were explored using Spearman correlation coefficients. The effects of categorical variables on numeric dependent variables were analyzed using one-way analysis of variance or factorial analysis of variance. General linear models were used to analyze the effects of several categorical and numeric variables on a numeric dependent variable. If the dependent variable was dichotomous, logistic regression was used instead. The change in average RF level within the group between the two time points was assessed with a *t* test for repeated measures. Due to the exploratory and novel nature of the research questions, marginally (statistically) significant associations also are reported. All statistical analyses were performed using SAS 9.2 software (SAS Institute, 2008).

RESULTS

Background, Substance Abuse, and Treatment Characteristics

Sociodemographic and other background data are presented in detail in Table 4. The reported amount of substance abuse during this pregnancy varied from no substance abuse during the pregnancy to daily use of multiple drugs through the third trimester. The most commonly used drugs were buprenorphine (illegally obtained), hashish, and amphetamines. Seventeen mothers (50%) reported having received medication and treatment for a mental health problem during pregnancy, and 13 (38%) postnatally reported so.

The treatment had a planned ending in 70% of the cases, with the mother returning home as the primary caregiver together with her baby. Individual treatment was planned for 90% of the mothers upon their discharge from the residential units. Plans for children to be followed in hospital sociopediatric units upon discharge also were made for 75% of the children. Focused support for the mother-child relationship (e.g., organized by the units' outpatient service) also was planned for 80% of the cases (Information about the outcome of these discharge plans was not available for this study.) During the 2-year follow-up, 14 children (41%) required foster care placements (either temporarily or permanently) due to mother's relapse to substance use and/or otherwise insufficient caregiving for the child.

Maternal-Trauma History, Psychiatric Symptoms, Interaction with the Baby, and Child Development

Descriptive statistics are presented in Table 5 and also have been reported in more detail elsewhere (see Pajulo et al., 2010). During their early childhood and lifetime, the most frequent trauma, per mothers' self-reports, concerned substance abuse within their family and family separations (e.g., parental divorce, foster care placement, death, and illness or hospitalization of a family member).

Over 50% of the mothers reported symptoms of depression (EPDS) prenatally. Over 30% reported having a psychiatric disorder postnatally (BSI, EPDS). In addition to depression,

mothers reported a wide range of other symptoms postnatally (e.g., somatization, paranoia, and psychoses).

Postnatal mother–baby interactions were generally weak (Care Index; Crittenden 2003), with over 50% assessed as being within the high-risk range on sensitivity and 45% with high scores for unresponsiveness. All infants showed development within normal limits at 4 months of age according to the BSID-II assessment.

Maternal RF

Descriptive statistics and outcomes for maternal RF are presented in Table 6. Prenatal RF (PI overall score) was weak ($M = 2.4$, $SD = 1.3$), on average, as was postnatal RF (PDI overall score) ($M = 3.0$, $SD = 1.0$). However, the within-group range at each time point was large (e.g., from total rejection and hostile RF to adequate, “ordinary” RF). During pregnancy, only 1 mother (5%) was found to have an overall RF score representing “close to ordinary” RF. In comparison, 9 mothers (30%) had “close to ordinary” overall RF scores postnatally. The RF level (overall score) increased from pre- to postnatal phase (i.e., during intervention) in 63% of the mothers, remained the same in 31% of the mothers, and decreased for 1 mother. The highest RF score for any single item increased for 70% of the mothers, and the lowest RF score for any single item increased for 20% of the mothers during the intervention. The average increases in overall and highest single-item RF score were statistically significant, for overall RF: $t = 2.4$, $df = 15$, $p = .02$; for highest item score: $t = 3.8$, $df = 15$, $p < .001$.

On the prenatal PI interview, the following items correlated most highly with the overall RF score: “How did you feel when you found out you were pregnant?” ($r = 0.84$); “When you think of baby’s earliest months, what do you imagine will be the most pleasurable times for you?” ($r = 0.84$); and “What aspects of the pregnancy have been most enjoyable for you? Have you had good feelings about the pregnancy?” ($r = 0.82$).

On the postnatal PDI interview, the following items correlated most highly with the overall RF score: “Describe a time in the last week when you and your child really weren’t clicking.” ($r = 0.71$); “How do you think your experiences being parented affect your experience of being a parent now?” ($r = 0.70$); and “How do you think your relationship with your child is affecting his/her development or personality?” ($r = 0.64$).

Respective associations between maternal prenatal RF, postnatal RF, and change in RF during intervention with other factors were examined, including maternal age, age of first substance use, primary abused substance, education, planning of this pregnancy, parity, amount and type of trauma experienced by mother in early childhood and in lifetime (TAQ), amount and type of maternal psychiatric symptoms (BSI, EPDS), maternal interaction with the baby (CI), and child development (BSID-II).

Results showed that maternal education, primary abused substance, and trauma were significantly or marginally significantly associated with RF. Higher education was associated with higher maternal postnatal RF (overall score) ($n = 28$), $F = 2.75$, $df = 3$, $p = .06$. Larger positive changes in maternal RF (overall score) were found for mothers who only used drugs than for mothers whose use included drugs and alcohol ($n = 16$), $F = 4.8$, $df = 2$, $p = .03$. Greater exposure to physical abuse and secrets within the family in early childhood, respectively, corresponded to less positive change in RF during the intervention; this was true across all RF values (e.g., overall, lowest, and highest scores) ($n = 16$), $r = -0.66$ – -0.56 , $ps = .02$ – $.07$. In addition, the more the mother had experienced family secrets, physical and emotional abuse, or neglect during her lifetime, the less positive change in RF (on overall and lowest scores) during the intervention ($n = 16$), $r = -0.77$ – -0.53 , $ps = .01$ – $.07$.

Prenatal and postnatal maternal RF also were intercorrelated: Higher prenatal RF was associated with higher postnatal RF (RF overall score) ($n = 16$), $r = 0.56$, $p = .02$. Pre- and postnatal RF levels (overall, lowest, and highest scores) were not found to be associated with maternal interaction results, psychiatric symptoms, or child-development scores.

Descriptive statistics for pre- and postnatal RF levels and later need for child placement into foster care (temporary or permanent) are presented in Table 7. The marginally significant results, $p = .08$, odds ratio = 2.3, 95% CI = 0.91–5.9, suggest that pre- and postnatal RF levels were lower among mothers whose children needed later placement into foster care. For example, among those mothers whose postnatal RF was close to adequate or higher (i.e., RF 4–5) ($n = 8$ mothers), only 1 child (12%) needed temporary foster care during the 2-year follow-up period. In comparison, among those mothers whose postnatal RF level was less than 4 ($n = 21$ mothers), 9 children (43%) needed temporary or permanent foster care/ placement during follow-up.

Described in more detail in a previous report (Pajulo et al., 2011), of all other variables tested (treatment and measure variables, background variables including duration of pregnancy at entering treatment, prenatal entering in treatment, and length of treatment), the amount of a certain type of psychiatric problem in the mother during the postnatal period was the only one statistically significantly associated with later child protection actions needed during the 2-year follow-up (level of postnatal somatization symptomatology, hostile symptomatology, and paranoid symptomatology).

Noncompleters

Eleven mothers who enrolled in the study left treatment earlier than 4 months' postpartum. There were no statistically significant differences in their sociodemographic background (age, marital status, education), pregnancy data (parity, duration of pregnancy at entering treatment, planning of pregnancy), or substance-abuse data (age at starting substance abuse, primary substance abused, amount of abuse) as compared to the completers. In addition, the prenatal RF mean and range were exactly the same as those in the completers' group. However, the noncompleters were somewhat younger than were completers ($M_{\text{age}} = 23$ vs. 25 years, respectively), and a larger percentage of noncompleters used alcohol or a mixture of alcohol and drugs (60 vs. 40%, respectively).

DISCUSSION

Theories of mentalization and RF recently have received greater attention and currently represent one of the most actively developed and explored areas in both adult and child psychiatry (Fonagy, 2008; Fonagy et al., 2002; Steele & Steele, 2008), and are considered to have considerable clinical relevance to high-risk groups (Fonagy et al., 2002; Suchman et al., 2008). A parent's capacity for RF and its impact on early mother–infant interaction, child attachment and development also have become of special interest in the infant mental health field (Slade, 2002, 2008). Nevertheless, there have been very few empirical studies on this topic, and further research is needed. Accordingly, the primary aim of this study was to explore maternal pre- and postnatal capacity to mentalize in a sample of especially high-risk mothers who enrolled in residential treatment with their babies due to severe substance-abuse problem. A second aim was to explore associations between individual differences in this capacity with other factors and early parenting characteristics.

The small sample size, lack of control group, and diversity of abused substances among mothers in the sample are limitations of the study, and conclusions must therefore be considered preliminary. Also note that fewer cases were available for data analyses involving maternal experience of trauma and RF change during intervention because of

attrition. Lack of more detailed follow-up data, partly due to constraints from the child protective services within which the study took place, also was a study limitation.

Despite these limitations, the results are clinically relevant and interesting. Maternal interaction with the 4-month-old baby during the intervention was found to be generally weak (assessed with Care Index method; Crittenden 2003). A large number of mothers in this sample reported having different psychiatric symptoms as well as experiences of early childhood and lifetime trauma. These findings are in accordance with previous studies among substance-abusing women and mothers (Ashley et al., 2003; Johnson, Brems, & Burke, 2002) and illustrate the challenges in creating interventions for these mothers. The association found between certain type of maternal postnatal psychiatric symptomatology and later need for child's placement into foster care (Pajulo et al., 2011) underlines the importance of active collaboration between infant psychiatry and adult mental health professionals to enhance more early identification of mothers' psychiatric problems and to increase the efficacy of their treatment together with the baby.

Maternal RF was, on average, very weak during pregnancy and weak in the postnatal phase, but individual variation was remarkable, ranging from rejection of RF to adequate and normal RF. The average level of maternal RF within the group increased significantly during the intervention period. Smaller increases in RF during the intervention were associated with alcohol problems or mixed abuse and amount and type of experienced trauma (family secrets, physical and emotional abuse) both in early childhood and across mother's lifetime. Mothers whose children needed temporary or permanent foster care placement during the 2-year follow-up showed lower pre- and postnatal levels of RF. Within this high-risk sample, postnatal RF level seemed to be a better predictor of prognosis for later mother-child interactions than was a short, video-based observational assessment of maternal sensitivity in the postnatal phase (Pajulo et al., 2010).

Pioneering work has been done to develop interventions for high-risk populations within an organizational or a foundation-based sector (e.g., Save the Children organization, Mannerheim League for Child Welfare, and Federation of Mother and Child Homes and Shelters in Finland). Unfortunately, systematic empirical research with objective measures has rarely been done in this context evaluating the efficacy of their important work. The treatment model and research project described in this article can be considered unique in this regard. Substance-abusing mother-baby pairs are perhaps the most challenging group for infant mental health and social workers. In developing the program described herein, enhancing maternal RF (i.e., keeping the baby in the mother's mind) has been chosen as a central domain that is critical to the treatment's efficacy (Rationale and techniques for RF-enhancing work in these units have been previously described in a separate article in this journal; Pajulo et al., 2006.)

From the child's point of view, the residential model of treatment described can be considered important for several reasons: First, the intervention is designed to begin during pregnancy. Prenatal exposure to substances has potentially severe negative consequences for the child's development, both directly (e.g., substance effects) and indirectly (e.g., poor maternal-health condition, poor nutrition, infection, and compromised prenatal attachment). Access to this kind of treatment should be possible even earlier than it was for this sample since motivation and openness for change is often stronger during the pre-perinatal period.

Second, the treatment focuses simultaneously on maternal substance abuse, mental health, the child's basic needs, and supporting the mother-child relationship. Experience in early relationships with parents is known to be crucial for the child's brain development as well as cognitive, emotional, and social development (Cicchetti & Toth, 2009). Mentalization-based

treatment interventions specifically target improvement in early relationship quality. The positive consequences from a successful treatment have the potential for a large and sustained impact in this high-risk group.

Finally, in the case of permanent placement of children in foster homes, important and intensive early work to support the mother–child relationship within a safe residential-treatment context is valuable from the baby’s developmental point of view and for the mothers’ future solutions and collaborative capacity.

Clinical Implications

Substance-abusing mothers are an especially challenging group from a clinical point of view due to cumulative and severe psychosocial risk factors and difficulties with entering and remaining in treatment. These difficulties easily engender feelings of hopelessness and frustration in professionals. Nonetheless, promising approaches have yet to be introduced in their treatment, and we suggest that one of them involves focusing more directly on RF enhancement. The preliminary findings of this study support this assumption, offering a window of possible connection between RF and trauma history and parental psychopathology.

During the time of collecting data for the current study, the staff of the treatment units were in their beginning phase of learning how to enhance maternal RF. The techniques and tools for RF-enhancing clinical work can and should be further developed and tested. Investing and succeeding in the treatment of the early mother–baby relationship has enormously large and longstanding positive effects—for both the mother and the child. All mothers who are willing to work intensively for abstinence from substances and good-enough parenthood for the sake of their child need to have access to such interventions from very early on within a context that is safe from the baby’s point of view that provide continuous monitoring and intensive support.

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TABLE 1

Substance-Abusing Mother–Baby Pairs in Residential Treatment (N = 34): Procedure and Measures

Pregnancy (<i>n</i> = 24) Background data PI	Baby 3 months (<i>N</i> = 34) BSI EPDS Type	Baby 4 months (<i>N</i> = 34) CI PDI BSID-II Name	Child 1 year (<i>N</i> = 34) Child substitution care TAQ (<i>n</i> = 23) Abbreviation	Child 2 years (<i>N</i> = 34) Child substitution care Developer
Early Interaction	Video measure	Care Index for Infants and Toddlers	CI	Crittenden, 2003
Mentalizing Capacity	Interview	Pregnancy Interview Parent Development Interview	PI PDI	Slade et al., 2004; Slade et al., 2005
Psychiatric Symptoms	Questionnaire	Brief Symptom Inventory	BSI	Derogatis, 1993
Depression	Questionnaire	Edinburgh Postnatal Depression Scale	EPDS	Cox, Holden, & Sagovsky, 1987
Traumatic Experiences	Questionnaire	Traumatic Antecedents Questionnaire	TAQ	Van der Kolk, 2003
Child Development	Standardized test battery	Bayley Scales of Infant Development (MDI = Mental Development Index) (PDI = Psychomotor Development Index)	BSID-II	Bayley, 1993

TABLE 2

Characteristics of the Observation-Based Measures

Measure	CI	BSID-II
Type	Video measure	Standardized test of development
Aspects	Sensitivity	Mental Development Index (MDI)
	Controlling behavior	Psychomotor Development Index (PDI)
	Unresponsive behavior	
No. of items	21	178 (MDI), 111 (PDI)
Domains	Facial expression	MDI Memory
	Vocal expression	Habituation
	Position and body contact	Problem solving
	Expression of affection	Language development
	Turn-taking contingencies	Social development
	Control	PDI Coordination
	Choice of activity	Gross motor skills
		Fine motor skills
Theoretical range	0–14	<69–>115
Classifications	Sensitive (11–14)	Significantly delayed (<69)
	Adequate (7–10)	Mildly delayed (70–84)
	Intervention range (5–6)	Within normal limits (85–114)
	High risk (0–4)	Accelerated performance (>115)

CI = Care Index of Infants and Toddlers (Crittenden, 2003); BSID-II = Bayley Scales of Infant Development II (Bayley, 1993).

TABLE 3

Characteristics of the Self-Report Questionnaires and Scales/Scores Used

	EPDS	BSI	TAQ
No. of items	10	53	38
No. of subscales		9	9
Scale of item scores	0–3 (<i>not at all to much</i>)	0–4 (<i>none to very much</i>)	0–3
Total Score (theoretical range)	0–30		0–27 (Childhood) 0–108 (Lifetime)
Total and Subscale Score Index (theoretical range)		0–4	
Cutoff point	12/13	0.90/0.91 (BSI-GSI)	
Subscales (no. of items)		Somatization (7) Obsessive-compulsive symptoms (6) Interpersonal problems (5) Depressive symptoms (6) Anxiety symptoms (6) Hostility (5) Phobic anxiety (4) Paranoidic symptoms (5) Psychotic symptoms (5)	Neglect (5) Separations (4) Family secrets (2) Physical abuse (3) Emotional abuse (5) Sexual abuse (4) Witnessing trauma (6) Other trauma (6) Exposure to alcohol or drugs (2)

EPDS = Edinburgh Postnatal Depression Scale; BSI-GSI = Brief Symptom Inventory Global Symptom Index; TAQ = Traumatic Antecedents Questionnaire.

TABLE 4
Background and Other Characteristics of Substance-Abusing Mothers in Residential Treatment with Their Babies (N = 34)

	<i>M</i>	<i>SD</i>	<i>Mdn</i>	Upper 25%	Lower 25%	Range
Maternal age (years)	25.1	5.8	24.0	28.7	20.2	16–38
Duration of pregnancy at entering treatment (weeks of gestation)	30.8	5.8	33.0	36.0	26.5	21–39
Age at starting substance abuse (years)	14.7	3.6	14.0	17.0	13.0	6–27
Duration of pregnancy at birth (weeks of gestation)	39.4	1.7	39.0	40.0	39.0	34–42
Birth weight of the child (g)	3,329	456	3,285	3,590	3,012	2,130–4,410
Length of residential treatment (months)	9.0	4.5	7.0	12.2	6.0	3–18

	<i>n</i>	%
Single parenting	15	44
First child	23	68
Only basic education (maximum 9 years)	24	71
Long-term unemployment (>1 year)	15	44
Entering treatment unit during pregnancy	24	71
Unplanned pregnancy	22	65
Substance use during this pregnancy	27	79
Substitution medication during pregnancy	7	20
Substitution medication postnatally	5	15
Child's father having a severe substance-abuse problem	29	85
Previous children taken into substitution care	11/11	100
Primarily a drug problem	20	59
Polysubstance-abuse problem	7	21
Alcohol problem	7	20
Excessive smoking	34	100
Withdrawal symptoms at birth FAE/FAS dg in baby	10	31
FAE/FAS dg in baby	1	3

Descriptive Statistics of the Measure Results Among Substance Abusing Mothers in Residential Treatment with Their Babies During Postnatal Period (N = 34)

TABLE 5

Variable	M	SD	Mdn	Range	Lower 25%	Upper 25%
CI sensitive	4.4	2.1	4.0	0–9	3.0	6.0
CI controlling	3.5	3.4	3.5	0–10	0.0	6.0
CI unresponsive	6.1	4.3	4.7	0–14	2.8	10.0
BSID-II (MDI)	97.5	7.0	97.0	85–111	93.0	104.5
BSID-II (PDI)	95.3	8.4	98.0	71–110	89.0	101.0
EPDS prenatal ^a	10.6	4.4	10.0	3–20	8.0	14.0
EPDS postnatal	9.0	5.4	8.5	1–22	5.0	12.0
BSI-GSI	0.9	0.7	0.7	0.1–2.6	0.41	1.1
TAQ Total Score Early Childhood ^b	2.9	2.7	2.7	0–13	1.5	3.3
TAQ Total Score Lifetime ^b	26.1	12.6	23.3	5–50	17.1	34.7

CI = Care Index; BSID-II = Bayley Scales of Infant Development; EPDS = Edinburgh Postnatal Depression Screen; BSI-GSI = Brief Symptom Inventory Global Symptom Index; TAQ = Traumatic Antecedents Questionnaire.

^a n = 20.

^b n = 23.

Residential Treatment Intervention for Substance-Abusing Mother–Baby Pairs (N = 34). Descriptive Statistics of Maternal Reflective Functioning (RF), Assessed Prenatally with the PI Interview and Postnatally with the PDI Interview

TABLE 6

	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Mdn</i>	Range	Lower 25%	Upper 25%
PI total RF single score	19	2.4	1.3	2.5	0–4.5	1.8	3.5
PI highest RF score	19	3.8	0.9	4.0	2.0–5.5	3.0	4.3
PI lowest RF score	19	1.3	1.3	2.0	–1.0–3.0	1.0	2.3
PDI total RF single score	29	3.0	1.0	3.0	1.0–5.0	2.5	4.0
PDI highest RF score	29	4.6	1.1	5.0	2.0–6.5	4.0	5.5
PDI lowest RF score	29	1.0	0.4	1.0	0–2.0	1.0	1.0
Pre-/postnatal total RF single score change	16	0.6	1.1	0.5	–2.0–2.5	0	1.5
Pre-/postnatal highest RF score change	16	0.9	0.9	1.0	–0.5–2.5	0	1.6
Pre-/postnatal lowest RF score change	16	–0.3	1.2	–0.5	–2.0–1.5	–1.1	0.3

TABLE 7

Residential Treatment Intervention for Substance-Abusing Mother–Baby Pairs. Descriptive Statistics of Maternal Mentalizing Capacity (RF) During Pregnancy and at 4 Months Postnatally, Assessed with the Pregnancy Interview (PI) and the Parental Development Interview Revised (PDI) Interviews

	Group 1 ^a						Group 2 ^b					
	1 Year			2 Years			1 Year			2 Years		
	<i>n</i>	<i>M</i>	<i>SD</i>	Range	<i>n</i>	<i>M</i>	<i>SD</i>	Range	<i>n</i>	<i>M</i>	<i>SD</i>	Range
PI total RF single score	13	2.6	1.4	0–4.5	10	2.6	1.5	0–4.5	5	1.8	1.0	1.0–3.5
PI highest RF score	13	4.0	0.9	2.0–5.5	10	4.0	1.0	2.0–5.5	5	3.3	0.8	2.5–4.5
PI lowest RF score	13	1.5	1.4	–1.0–3.0	10	1.6	1.4	–1.0–3.0	5	0.9	1.2	–1.0–2.5
PDI total RF single score	22	3.2	1.1	1.0–5.0	18	3.2	1.2	1.0–5.0	7	2.4	0.7	1.5–3.0
PDI highest RF score	22	4.8	1.2	2.0–6.5	18	4.8	1.3	2.0–6.5	7	4.1	0.8	3.0–5.0
PDI lowest RF score	22	1.0	0.3	0.5–2.0	18	1.0	0.3	0.5–2.0	7	0.9	0.6	0–2.0

^aGroup 1 = children needing no placements into substitution care during 2-year follow-up, at 1 year and 2 years of age.

^bGroup 2 = children with one or more placement(s) into substitution care at 1 year and 2 years of age.